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| EXAMINER |
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KRISHNAN, MALINI

|          |              |
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| ART UNIT | PAPER NUMBER |
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1714

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS                               | 02/02/2007 | PAPER         |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/828,594 | <b>Applicant(s)</b><br>LUXEM ET AL. |  |
|                              | <b>Examiner</b><br>Malini Krishnan   | <b>Art Unit</b><br>1714             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/21/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-5, 7, 9-11, 14-16, 18-25, 29-30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Hammond ('044), hereinafter referred to as Hammond.

Hammond discloses a method for producing fatty acid alkyl esters useful as biodiesel, which comprises the steps: providing a vegetable oil source comprising free fatty acids and glycerides, providing methanol in an amount of between about 1.0 and 5.0 molar equivalent compared to the total moles of the vegetable oil source, mixing the methanol and the vegetable oil source in the presence of between about 0.1% and 7.5% by weight catalytic acid, heating the reaction mixture to a temperature of greater than 65°C, maintaining pressure above ambient pressure, reacting the mixture and recovering fatty acid alkyl esters. An upper and bottom layer are formed, wherein the bottom layer contains water and glycerol, which are removed to recover the produced fatty acid alkyl esters. This process allows for more than about 80% completion in less than about 2.5 hours (Col. 2, lines 50-61; Col. 3, lines 4-16, 31-38, 45-50, 59-61; Col. 4, lines 10-15). Additionally, the vegetable oil source is an acidulated soybean soap stock, which can be utilized in an amount between about 60-wt% and 90-wt% of the total

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weight of mixture. Methanol is added according to a molar ratio of oil:methanol as 1:1.3, and sulfuric acid catalyst in the amount of 1.2% by weight of acid oil is used. It is the examiner's position that the molar ratio provided corresponds with the amounts of 10-wt% to 40-wt% of the total weight of mixture for methanol in claim 25, part (a) (Col. 4, lines 25-67; Table 1; Col. 6, lines 20-22).

With regard to claims 9-11, 18-20, and 29-30, Table 1 discloses percentages of free fatty acids in the alkyl ester product as well as the starting material. Since the acid value of the product and starting material can be deduced from the amount of free fatty acids, it is the examiner's position that the disclosed percentages correspond to a acid value between 107 and 187 for the starting material, and less than about 2.5 for the product.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 6, 12, 17, 27, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammond in view of Bam ('467), hereinafter referred to as Bam.

The disclosure of Hammond in paragraph 2 above is herein incorporated by reference.

Hammond is silent with respect to (i) a step of removing by-products of reaction during processing as claimed in instant claims 6, 17, and 27, and (ii) a step of subjecting the removed water to further reaction as claimed in instant claims 12, 13, and 31.

With regard to (i) above, Bam discloses a method of making alkyl esters wherein a natural by product of glycerin is removed in a separate step using vacuum distillation. The glycerin can then be condensed and purified for subsequent use as a by-product or solvent (Col. 4, lines 46-48; Col. 5, lines 1-10).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Hammond and Bam in order to utilize the advantages disclosed by Bam of removing the glycerin in a separate step so that it can be reused in the reaction.

With regard to (ii) above, Bam discloses a step of removing water using a dewatering column from the reaction product and condensing it to be used in further reactions (Col. 8, lines 34-40).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Hammond and Bam in order to utilize the advantage of reusing the water when removing it.

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6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hammond in view of Bam, and further in view of Bournay ('837), hereinafter referred to as Bournay.

The discussions of Hammond and Bam in paragraphs 2 and 5 above are herein incorporated by reference.

Both Hammond and Bam are silent with respect to the use of vacuum drying to remove dissolved water.

Bournay discloses a method of producing alkyl esters from a vegetable oil source and methanol, which includes a step of removing water from the product by vacuum drying. The removal of water by vacuum drying enhances the process because water in the reaction mixture would encourage the formation of fatty acids instead, and would inhibit the catalyst (Col. 2, lines 40-47; Col. 5, lines 23-28).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to combine the teachings of Hammond, Bam, and Bournay in order to minimize the negative effects water would have on a complete reaction of fatty acids in vegetable oil with methanol to fatty acid alkyl esters.

7. Claims 8 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammond in view of Haas ('800), hereinafter referred to as Haas.

The discussion of Hammond in paragraph 2 above is herein incorporated by reference.

Hammond is silent with respect to an amount greater than about 85.0 grams of biodiesel being produced per 100 grams of vegetable oil source.

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Haas discloses a method of producing fatty acid alkyl esters, which comprises mixing a vegetable oil source with methanol and an acid catalyst. The method produces greater than about 85.0 grams of fatty acid alkyl esters per 100 grams of vegetable oil source (Col. 5, lines 5-18).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to combine the teachings of Hammond and Haas in order to obtain a high conversion of fatty acid alkyl esters from a vegetable oil source and methanol.

### ***Double Patenting***

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-6 and 16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 and 9 of U.S. Patent No.

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6,768,015. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the reasons set forth below.

Claims 1-5 and 9 of U.S. 6,768,015 disclose a method of producing an alkyl ester comprising the steps: providing a vegetable oil source comprising free fatty acids and/or glycerides, providing methanol in an amount between about 1 to 5 molar equivalents, mixing the methanol and vegetable oil source in the presence of a catalytic acid in an amount between about 0 to 0.5 wt%, heating the mixture to a temperature of between about 80 and 200°C; maintaining a pressure between about 25 and 500 psia, which is above ambient pressure, recovering an effective conversion of the free fatty acids and/or glycerides into fatty acid alkyl esters, and removing by-products during processing. These steps clearly anticipate the steps of instant claims 1-6.

Claim 6 of U.S. 6,768,015 disclose a method of producing an alkyl ester comprising steps that clearly anticipate the steps of instant claim 16.

However, the claims of U.S. 6,768,015 are silent with respect to the claimed method in making biodiesel.

Applicant's attention is drawn to MPEP 804 where it is disclosed that "the specification can always be used as a dictionary to learn the meaning of a term in a patent claim." *In re Boylan*, 392 F.2d 1017, 157 USPQ 370 (CCPA 1968). Further, those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in an application defines an obvious variation of an invention claimed in the patent



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(underlining added by examiner for emphasis) *In re Vogel*, 422 F.2d 438,164 USPQ 619,622 (CCPA 1970).

Consistent with the above underlined portion of the MPEP citation, attention is drawn to column 1, lines 16-28 of U.S. 6,768,015 that defines alkyl esters as biodiesel. Thus, the instant claims 1-6 and 16 are obvious variations of U.S. Patent 6,768,015.

### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Malini Krishnan whose telephone number is 571-272-6519. The examiner can normally be reached on Monday through Friday, 8:00 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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